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West Acton Sewer Extension Project: Feasibility Study

Acton Water Resources Advisory Committee Meeting

March 12, 2008

COMMITMENT & INTEGRITY DRIVE RESULTS

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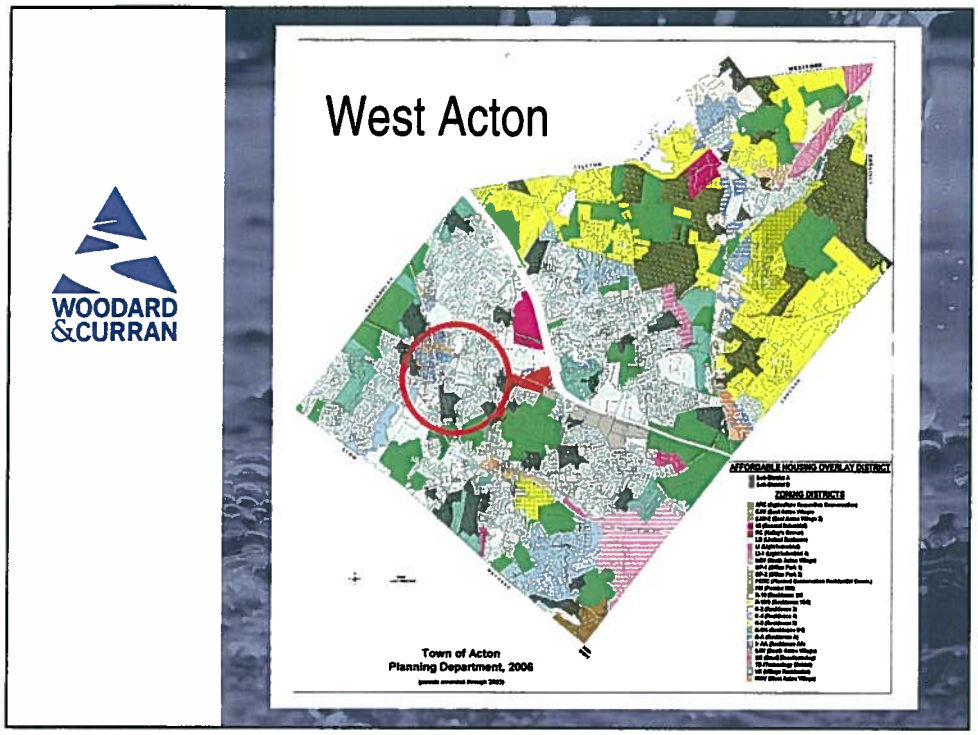
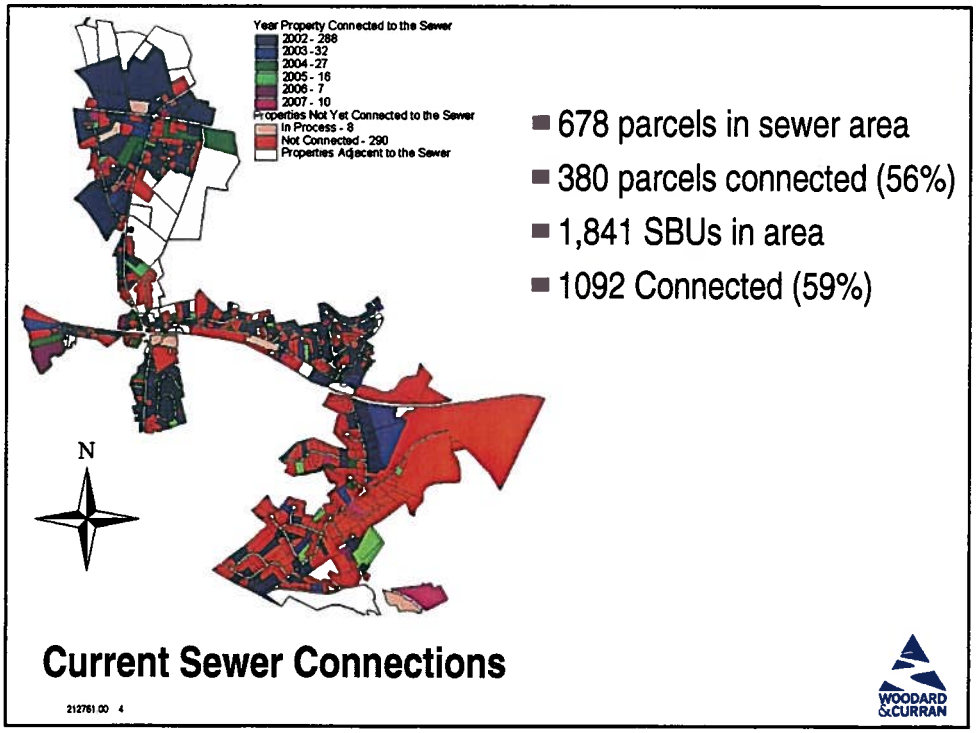
West Acton Sewer Extension Project

Why West Acton?

- Two areas identified in 2004 CWRMP as "Needs" areas requiring off-site wastewater solutions
  - Area 10: Spencer/Tuttle/Flint
  - Area 12: West Acton Center
- Goal of Study
  - Understand critical aspects of the project evaluation
  - Understand order of magnitude costs
  - Codify consensus with the Town and AWRAC

COMMITMENT & INTEGRITY DRIVE RESULTS

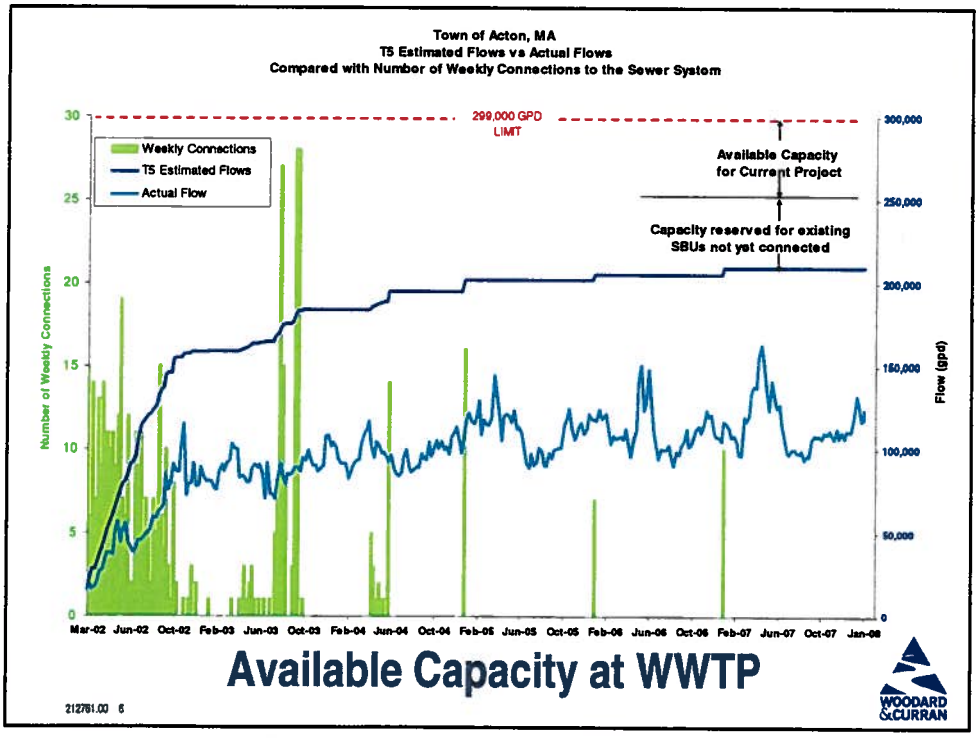


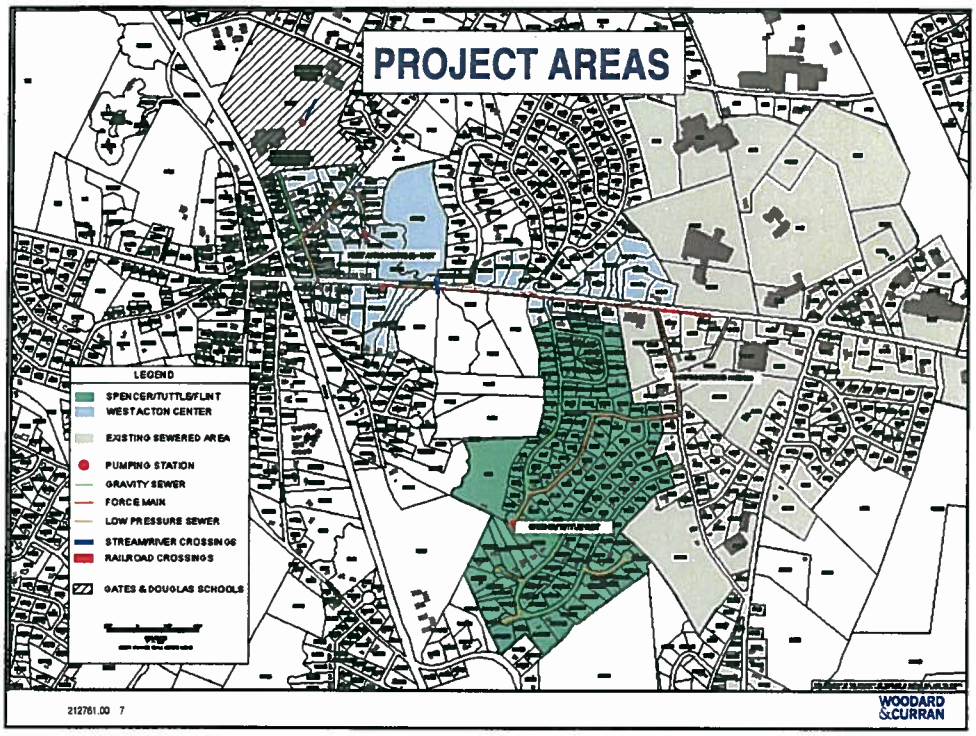


- 678 parcels in sewer area
- 380 parcels connected (56%)
- 1,841 SBUs in area
- 1092 Connected (59%)

Available Wastewater Capacity

- WWTF Effluent Capacity = 299,000 gpd
- Current Average Daily Flow = 115,000 gpd
- Capacity unallocated and available = 49,000 gpd




PROJECT AREAS
LEGEND
SPENCER/TUTTLE/FLINT
WEST ACTON CENTER
EXISTING SEWERED AREA
PUMPING STATION
GRAVITY SEWER
FORCE MAIN
LOW PRESSURE SEWER
STREAM/RIVER CROSSINGS
RAILROAD CROSSINGS
GATES & DOUGLAS SCHOOLS
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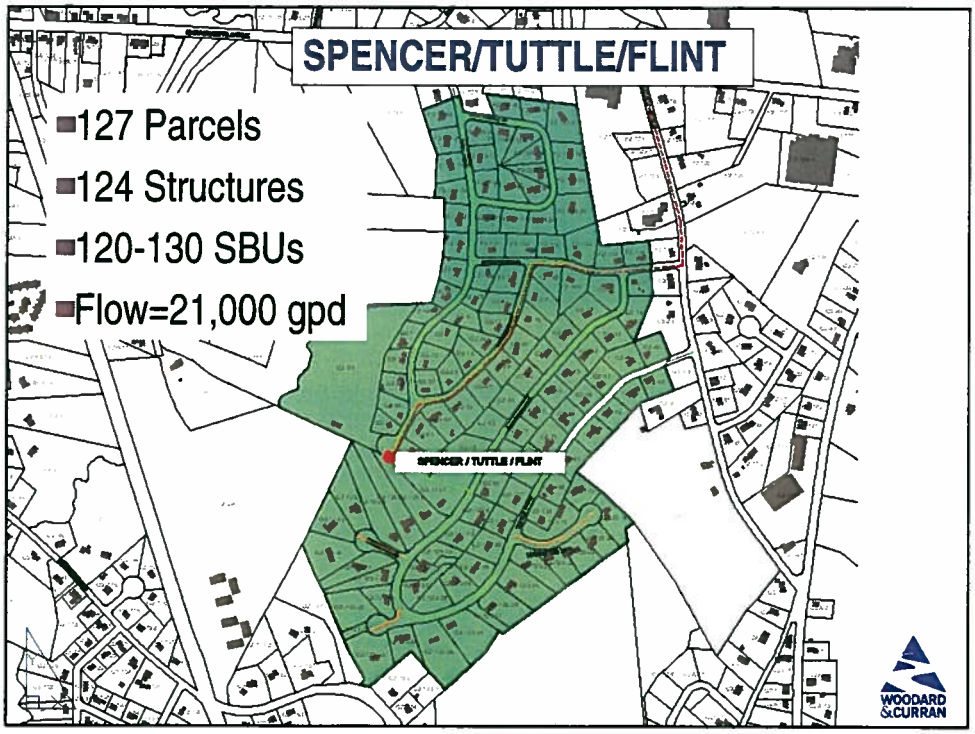
SPENCER/TUTTLE/FLINT
127 Parcels
124 Structures
120-130 SBUs
Flow=21,000 gpd
SPENCER / TUTTLE / FLINT
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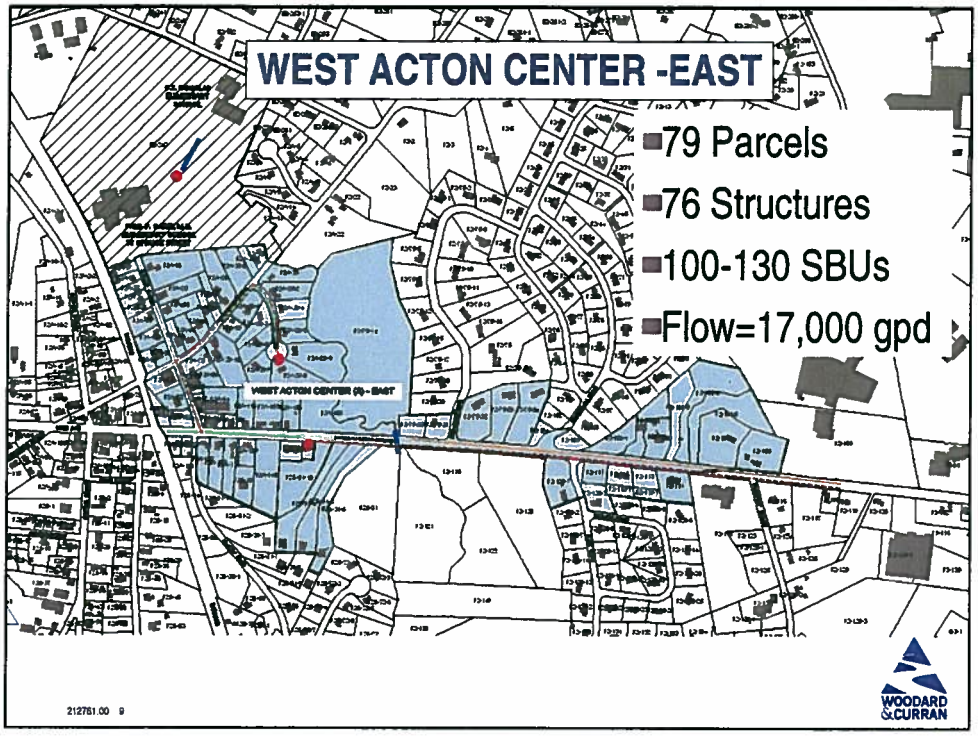

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Sewer Layout Criteria

- Areas defined in Scope of Work (excluding Douglas & Gates Schools)
- Current Zoning limits – "West Acton Village Zoning" & "Village Residential"
- Natural Topography – sewer depth/rivers
- Available Capacity up to 49,000 gpd (based upon actual winter water use)

Conceptual Design

15% Concept Design for Alternatives

- General areas of benefit (subject to changed based on site survey & detailed information)
- Rough sewer system layout
- Key design features (pump stations, river crossings)
- Typically ±15% accuracy on concepts

Direct Costs: Construction Cost Categories at Concept Level

- 8" PVC Sewer – varying depths
- 6" PVC Service Stubs per structure
- PVC Low Pressure Sewer
- Pumping Stations
- Paving Trenches – Local & State roads
- Paving Overlay – Local & State roads
- Water main & drain pipe replacement
- Ledge & Rock Removal
- Construction Contingency - 5% to 20%

Indirect Cost Categories at Concept Level

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Based on Construction Costs

- Design & Permitting – 10%
- Procurement & Construction Engineering – 15%
- Administration (Police, Financing, Legal) – 10%
- Contingency – 5%

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Table 1: West Acton Sewer Extension Project - Comparison of Alternatives

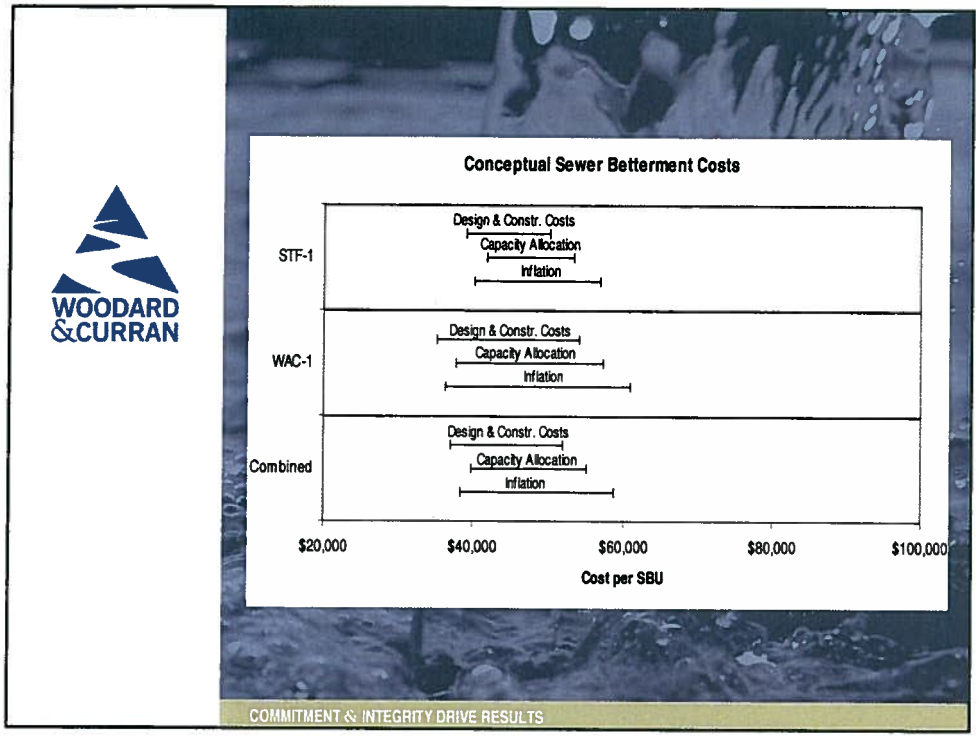
Items	Unit	Unit Cost	Alt. 1: WAC-I		Alt 5: STF-1	
			Quantity	Cost	Quantity	Cost
Direct Costs						
8" PVC Sewer (8-12 feet)	L.F.	135	2535	$342,225	7,260	$308,100
8" PVC Sewer (12-16 feet)	L.F.	150	1065	$159,750	2140	$321,000
8" PVC Sewer (16-20 feet)	L.F.	180	50	$9,000	600	$108,000
8" PVC Sewer (>20 feet)	L.F.	220	0	$0	0	$0
6" PVC Service Stubs (40 ft each)	L.F.	85	3160	$268,600	5080	$431,800
PVC Forcemain	L.F.	60	4900	$294,000	4000	$240,000
PVC Low Pressure Sewer	L.F.	70	2650	$185,500	850	$59,500
Paving - Trenches in Local Streets (3" depth)	Sq. Yd.	15	1,514	$20,717	10,196	$152,367
Paving - Trenches in State Roadway (3" depth)	Sq. Yd.	15	3,356	$50,333	0	$0
Paving - CDFin Local Roads	Cu. Yd	110	0	$0	1,000	$110,000
Paving - CDFin State Roads	Cu. Yd	110	3,461	$380,722	0	$0
Paving - Overlay Local Roads (2")	Sq. Yd.	10	5,333	$53,333	31,344	$313,444
Paving - Overlay State Roads (2")	Sq. Yd.	10	14,733	$147,333	0	$0
Water Main Relocation (15% total sewer l.f.)	L.F.	85	945	$80,325	1,620	$138,338
Drainage Pipe Relocation (5% total sewer l.f.)	L.F.	50	315	$15,750	543	$27,175
Ledge Removal (10% total sewer l.f. in ledge)	Cu. Yd.	85	1,386	$117,810	2,387	$202,895
Grinder Pumps	Each	4,200	17	$71,400	13	$54,600
Pump Stations	Each	400,000	2	$800,000	1	$400,000
Easements	L.F.	100	0	$0	500	$50,000
Stream and/or Railroad Crossings	Each	200,000	1	$200,000	0	$0
Construction Contingency Low - 5%	---	5%		$161,940		$179,488
Subtotal - Conceptual Construction Costs Low				$3,362,000		$3,769,000
Subtotal - Conceptual Construction Costs High				$3,865,000		$4,307,000
Indirect Costs						
Design & Permitting (10% of Construction)	Des. Cost	10%	---	$336,200	---	$376,900
Procurement & Constr. Engineering (15%)	Con. Cost	15%	---	$507,300	---	$565,350
Administration (Police, Financing, Legal, etc. - 10%)	Adm. Cost	10%	---	$336,200	---	$376,900
Indirect Contingency - 5%	Ind. Cost	5%	---	$193,250	---	$215,350
Subtotal - Conceptual Indirect Costs Low				$1,183,700		$1,319,150
Subtotal - Conceptual Indirect Costs High				$1,546,000		$1,722,800
Total Project Conceptual Costs Low				$4,494,000		$5,088,000
Total Project Conceptual Costs High				$5,411,000		$6,030,000
Total LF of Collection Sewer (LF)				8,300		$10,250
$/Ft of Sewer Low				$725		$469
$/Ft of Sewer High				$855		$556
Estimated SBUs Low			100		120	
Estimated SBUs High			130		130	
Sewers T (x1000 ft)			6.3		10.5	
SBU Density Low (SBUs per 1000 LF of sewer)			15.9		11.1	
SBU Density High (SBUs per 1000 LF of sewer)			20.6		12.0	
Conceptual Construction Costs per SBU Low			$35,123		$38,138	
Conceptual Construction Costs per SBU High			$34,110		$39,250	
Estimated Flows (5-year winter flow average)	GPD		17,001		20,368	
Title 5 Flows	GPD		54,525		48,510	
ENR Construction Cost Index (February 2008)		8,094				

Lessons Learned

- Need to account for price escalations prior to construction (2 years in this case)
- Include sufficient contingency
- Concept Designs may change slightly as design details become available
- Financial Models for Costs are key
  - Betterments
  - Operation costs
  - Working capital
  - Connection costs

Financial Impacts at the Feasibility Study level

- **Design & Construction Costs**
  - Based upon current construction climate
- **Capacity Allocation Costs**
  - Governed by Acton Sewer Bylaw
- **Inflation/Escalation Costs**


Conceptual Sewer Betterment Costs
STF-1
WAC-1
Combined
Design & Constr. Costs
Capacity Allocation
Inflation
$20,000
$40,000
$60,000
$80,000
$100,000
Cost per SBU
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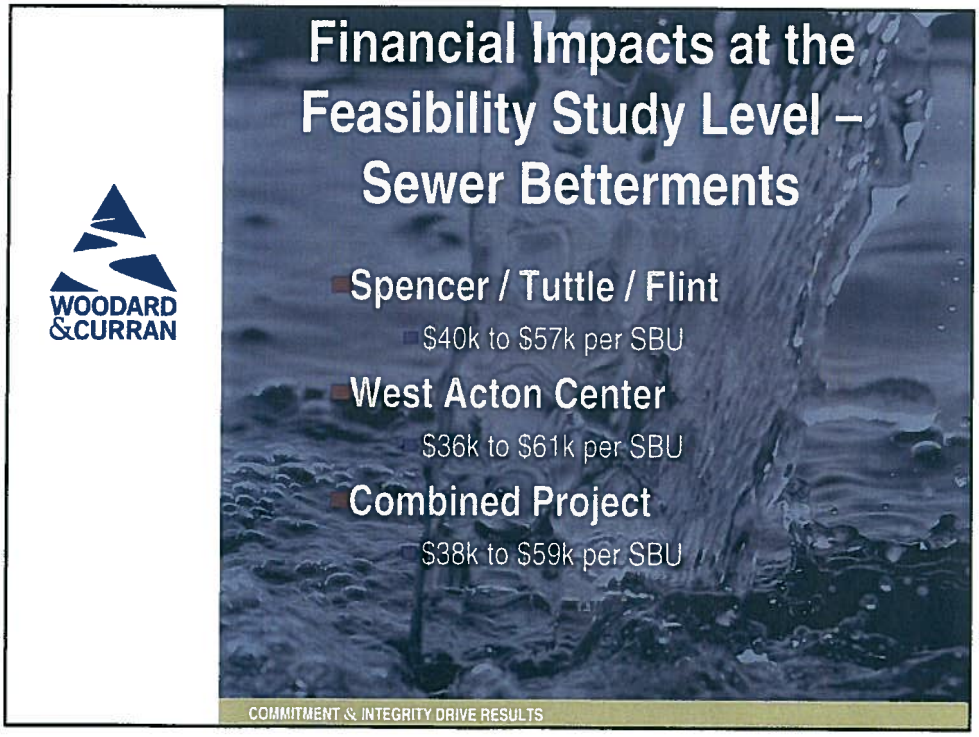
Financial Impacts at the Feasibility Study Level – Sewer Betterments
Spencer / Tuttle / Flint
$40k to $57k per SBU
West Acton Center
$36k to $61k per SBU
Combined Project
$38k to $59k per SBU
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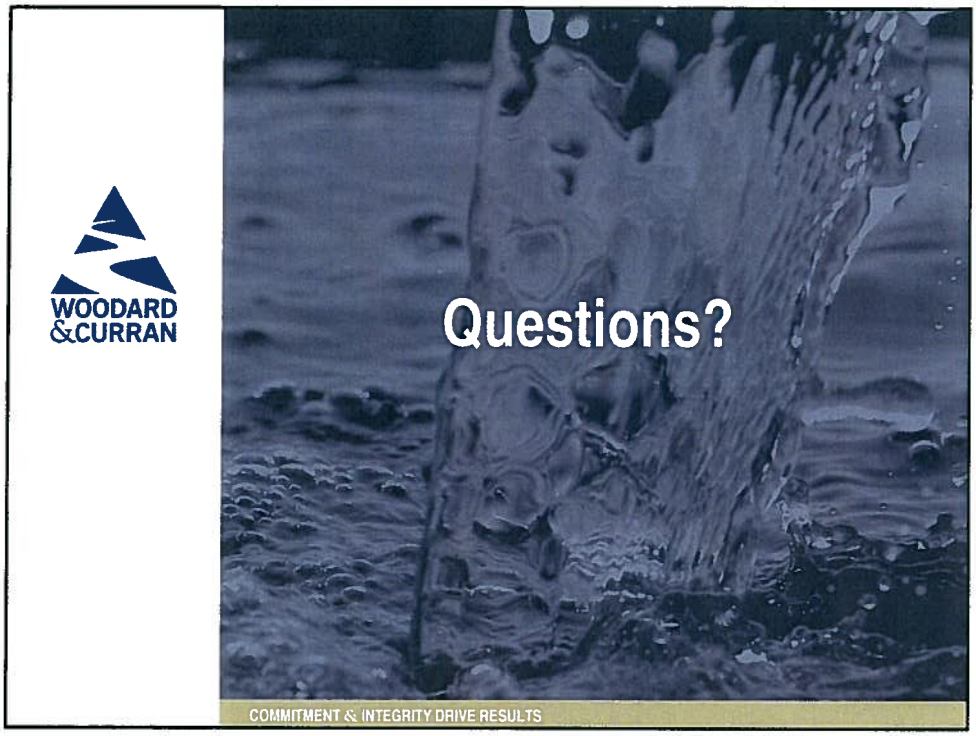
Economy of Scale - If both areas are Combined

- Reduced Indirect Costs
  - i.e., One round of permitting
- Optimize Design
  - i.e. Replace portion of low pressure sewer with gravity sewer along Mass Ave
- One Bid Cycle and Post Bid Review
- Reduced mobilization and oversight costs during Construction

Moving Forward

West Acton Sewer Extension Project	
Conceptual Schedule	
Task	Date
Feasibility / Design Basis	April 2008
Preliminary Engineering	July - Sept. 2008
Funding Applications	August 2008
Special Town Meeting	Fall 2008
Determining Funding Options	January 2009
Approve Design & Construction Funds	Spring ATM 2009
Detailed Design & Permitting	July 2009 - October 2009
SRF Submittal (if appropriate)	October 2009
Advertise for Bid	Winter 2010
Start Construction	April 2010
Finish Construction	December 2010
Start Connections	January 2011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Questions?
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